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REPLACEMENT SHEET

1/27



448 KD G1 i-antigen : protein and nucleic acid sequences

SEQ ID NO: 2 AACATTAACAAAGCTTTTATATAATTTTCAGGTATTTTATATAATTT
ATGCGATTATATATTTTATATAATTTAATTTAATTTAATTTAATTTAATTTAATTT
TATTTAATTTAATTTAATTTAATTTAATTTAATTTAATTTAATTTAATTTAATTT

Fig. 1

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REPLACEMENT SHEET

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G5 Wild-type											
SEQ ID NO: 44	10	20	30	40	50	60	70	80	90	100	110
	ATGAAAAATA ATTATTTAGT AATATTGTT ATTCAATT TTAATCAATA AAATPAATT CCTTAATTGTC CTTTGAAAC TGAAACPAAC ACAGGGAT AAGTTGATGA TTCTAGGAAC										
	130 140 150 160 170 180 190 200 210 220 230 240										
	CCTGCAAATT GTGTAAATTG TTAGAAAAC TTATTTATA ATAATGCTGC TGCTTCCCT CCTGGTCTA GAACTGTGCA ACCCTGTGCA TAAACCAAT										
	250 260 270 280 290 300 310 320 330 340 350 360										
	CCACCTCTTA CTGCTTAATT AGTCACATTA TTTAACCTTA AATGCCCTGC TGGPACCGCA ATTGGAGTG GAGCAACAGA TTATCCAGCA ATAAATCACAG AATGTTGTTAA TTGTTGAAATT										
	370 380 390 400 410 420 430 440 450 460 470 480										
	AATTUTTTATA ATGAAAMTC TCCAAATTTC ATTGCAATTG CTAGTACATG CACAGCTGT CGGTAAACA GAGTGTGG TGCTATTGACT GCTGTGTAAT CGGTACCAT AGTGCTATAA										
	490 500 510 520 530 540 550 560 570 580 590 600										
	TGTTAACCTCG CATSTCCTAC TGGTACTGGC CTTGATGATG GAGTAACTAC TGTTATGTT AGATCATTTA CAGAATGTTG TAATATGTT CTTAACCTTA ACTATATGTC TAATAATGCT										
	610 620 630 640 650 660 670 680 690 700 710 720										
	AATRACTCTT TCAATTCGGG TAAAGGTA TCCACCCCTT GTCCGGCAT TAACCTCTT AATGTTGCTT AGCTACTTT AGCTTAATGT GCTACATTA CGCGATTAATG TAACGTTGCA										
	730 740 750 760 770 780 790 800 810 820 830 840										
	TGCCCTGATG GTRACTATAG TGCTCTGGA GTAAATTGTT GGTAGCGCA AAACACTGA TGTTACTATT GGGCTCTAA CTITTAATGTT AATATGCTC CTRATTCTAA TCCAGGTTAT										
	850 860 870 880 890 900 910 920 930 940 950 960										
	ATPACATGCC TACCTGCC AGCAAAATAA GATTATGGTG CTGAAGCCAC TGCGGGTGT GCCGCTACTT TAGCCAAATA ATCTTATTT GCATGCCCTG ATGGTACTGC AATTGGCTGT										
	970 980 990 1000 1010 1020 1030 1040 1050 1060 1070 1080										
	GGAGGACTA ATTATGTTAT ATTATTAACA GAATGCTAA ATGTTGTCG TAATCTTTAT TTGTTGTTGA ATTATCTTA GGCGGGAGT AGTATGTCR AAGCATGTC AGCAATTA										
	1090 1100 1110 1120 1130 1140 1150 1160 1170 1180 1190 1200										
	CTTTAAGGG CTCGACCAAC TCCAGGTGT ACTGCTACTT TAATTTGATA ATGTCCTT GAATCCCTT CTGGTACTGT ACTCACCAGT GGAACACATT CTACTTATAA ATTAAGGAGCA										
	1210 1220 1230 1240 1250 1260 1270 1280 1290 1300 1310 1320										
	TCTGAAATGIG TAAATGIGC TGCCAACTTT TATACTCAA AAATAACTGA TTGGGTAGCA GGTATTGATA CTGGTACTAG TTGTTAATAA AAATTAACCTT CTGGGCCTGA AGCTTAATTA										
	1330 1340 1350 1360 1370 1380 1390 1400 1410 1420 1430 1440										
	CCTGAACTCG CTAAAAAAA TATATAATG GATTGGCTA ATTTCCTTC AATTTTATC TTATGTTTT CTTATTTATT ATTATGTT ATTATGTA										

Coding region: nucleotides 1-1404

Fig: 2a

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G5 SYNTHETIC

SEQ ID NO: 102	10	20	30	40	50	60	70	80	90	100	110	120
ATGAAAGAAC ACATCCCTGT GATCCTGTC ATCTCTCTGT TCACTAACCA GATCAAGTGT GCTAACTTC	130	140	150	160	170	180	190	200	210	220	230	240
CCTGGTAACT GTGTGAACTG TCAGAAGAAC TTCTACTACA ACACCCCTGC TGCTTTGCTG CCTGGAGCTT CTACCTGAT CCCTTGCTCT CAGAAGAAGC AGCGTGGAC CGAGACCAAC	250	260	270	280	290	300	310	320	330	340	350	360
CTCTCTGCTA CCCTTAACCT GGTCACCGT TGTAACTGA AGTGTCTGC TGGAAACGCT ATCGCTGGAG GCGCTGGCA CTAGCTGCT ATCATCACCG ATGTGTGAA CTGTGCTAC	370	380	390	400	410	420	430	440	450	460	470	480
AACCTCTACA ACCAGAAGGC TCCPAACTTC AACCGTGGAG CTCTACTCTG TACCGCTTCT CCTGTAACC CGCTGGAGG AGCTCTGACC GCTGAAAAG CTGGTACCAT CGGGTCTAG	490	500	510	520	530	540	550	560	570	580	590	600
TGTAACTGG CTGTCCTAC CGGAAACCT CTGGAGAGC GGTGACAC CAGCTAACTG CGCTTCTTA COGAGTGTGTG CTGAACTCT ACTACACGG AAACAAAGGA	610	620	630	640	650	660	670	680	690	700	710	720
AAACCCCTT TCAACCTGG AAAGCTGG TGTACCCCT CAAGCTCTAT GTCCTCTAT GTCACCCCT AACGTCGCTC AGCTGGCTC GGTAAACGAC GTCACATCA CGCTCTAGTG TAACGTCCT	730	740	750	760	770	780	790	800	810	820	830	840
TGTCTCTGG GAACCTTC TGTGTCTGA GTGAACTAACT GGTTGCTCTCA GAACACCGAG TGTTACCAACT GTCTCTCTAA CTTCATCTCA CTAACCTCAA CCCCTGGAAAC	850	860	870	880	890	900	910	920	930	940	950	960
TCTACCTGTC TCCCTCTCC TGTCTACAG GACTTACAG GAGTGTCTGA ACTGTCTGC TAACTCTPAC TTGCTGGAGA GCTGCTACCC TCGCTPAGCA GTCATACTC GCTGTCTCTG AGCGAACCGC TATGGCTCT	970	980	990	1000	1010	1020	1030	1040	1050	1060	1070	1080
GGAGGTACCA ACTACGTAT CCTCAGAAC GAGTGTCTGA ACTGTCTGC TAACTCTPAC TTGCTGGAGA ACAACTTCCA GGCTGTGACTC TCGCTGCTGA AGGCTGTCTC TCGTAACAG	1090	1100	1110	1120	1130	1140	1150	1160	1170	1180	1190	1200
GTCAGGGAG CTCCTCTAC CGCTTGGAG ACCCTTACCC TGATCTCTA GTCCTCTG GAGCTCTG CTGGAACCTT CTGGAACCTT CTACCTCAA CGAGCTGCT	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300	1310	1320
TCTCTCTG TGAGTGTGC TGCTAACTTC TACACCACCA AGCAGACCGA CTGGCTGCTG GGTAGTGTCA CTTGTTACCTC TGTGAAAG AAGGTGACCT CTGGGCTGAG GGCTAACCTG	1330	1340	1350	1360	1370	1380	1390	1400	1410	1420	1430	1440
CCTGGTCTC CTAAGAGAAA CATCAGCTGT GACTCTGGTA ACTTCCTCTG TAACTCTCTG CTGCTGATCT CTTACTACCT GCTGTATAA												

Coding region: nucleotides 1-1404

Fig. 2b



4/27

Sequence Alignment of 48 kD G1 i-antigen and 55 kD G5 i-antigen protein sequences

SEQ ID NO: 6	G1	1 MKYNILLILISLFLINELRAVCPDPGTQT-QAG-LTDVGAADLGTCVNCRPNFYNN---- 1 MKNNILVILLISLFINQIKSANCPCVGTEENTAGQVDLGLTP--ANCVNQCQKNFYNNAAA 1 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****	90 MKYNILLILISLFLIN MKNNILVILLISLFINQIKSANCPCVGTEENTAGQVDLGLTP--ANCVNQCQKNFYNNAAA 91 MKNNILVILLISLFIN	Conserved regions
SEQ ID NO: 7	G5	55 --GGAA-----QGEANGNQP 59 FVPGGASTCTPCPKDKDAGAQPNPPATANLVTQCNVKCPAGTAIAGGATDYAAITECVNC 59 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****	68 ----P-----AAN-NAARGICVPCQINRVGSVTTNAGDLATLATQCSSTCPTGTAIDDGVTIDV 119 RINFYNEA PNTNAGASTCTACPVNRVGGALTAGNATIVAQCNVNCPGTALDDGVTIDV 119 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****	92 CPTGTAIDDGVT
SEQ ID NO: 8	G1	120 FDRSAAQCVCKPNFYINGGSPQGEAPGVQVFAAGAAAAGVAAVTSQCVCPCQLNK--NDS 179 YVRSFTBECVKCRNPNFYINGN--GNTP----FNPCK----SQTCPCPAIKPANVA 179 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****	93 CVKCKPNFYNG 94 CVKCRNPNFYNG	
SEQ ID NO: 9	G1	178 PATAGAQANLATOCNSNQCPGTVLDDGVTLYVENTSATLCVKCRPNFYINGGSPQGEAPGV 224 QATLGENDATITQAQNVAACPDTGTLISAGYN-NWVAQNTECTNCAPNFNNN----AP-- 224 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****		
SEQ ID NO: 10	G1	238 QVFANGAAAAGVAAVTSQCVCPCQINKND-SPATAGAQANLATOCSTQCPTGTAIDGVTI 295 -NFNG-----NSTCLCPANKDYGAEATAGGATLAKOCNIACPDGTIAASGATN 295 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****		
SEQ ID NO: 11	G1	297 VFSNSSTOCSOCIANYFFNG-NFEAGKSOCILKCPVSKTKPAHAP-GNTATQATOCLITCP 325 -XVIIQTECLNCAANFYFDGNNFOAGSSRKACKACPANKVQGAVATAGGATLIAQCALECP 325 :*****:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****		
SEQ ID NO: 12	G1	355 AGTVLDGTSITNEVASATECTKCSAGFFASKTTGFTAGTDTCTECKKLTSGATAKVYAE 384 AGTVLDGTSITVYQAASECVKCAANFYTQKODWAGDNTCTSCNKKLTSGAEANLPES 384 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****		
SEQ ID NO: 13	G1	415 ATQKVQCASTTEAKFLSISLIFSYLL 444 AKKNIQCD---FANFLSISLILLISYYLL 444 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****		
SEQ ID NO: 14	G1	99 FAKFLSISLFLFISFYLL 100 FANFLSISLILLISYYLL 100 ***:*****:*****:*****:*****:*****:*****:*****:*****:*****:*****		

Fig. 3a

Title: DIAGNOSTIC AND PROTECTIVE ANTIGEN GENE SEQUENCES OF ICHTHYOPHTHIRIUS
Applicant(s): CLARK et al.
Serial No.: 09/497,967

Filed: February 4, 2000

Docket: 235.0017 0101
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REPLACEMENT SHEET

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Fig. 3b₁

Fig. 3b₂

Fig. 3b

REPLACEMENT SHEET

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Fig. 3b₁

Sequence Alignment of 48 kD G1 i-antigen
and 55 kD G5 i-antigen nucleotide sequences

G1 SEQ ID NO: 1 ATGAAATATAATTTTATTAAATTAAATTATTCTTTATTATTAAATGAATTAAGAGCT
G5 SEQ ID NO: 3 ATGAAAAATAATATTTAGTAATATTGATTATTCAATTAAATTAAATCT

G1	GTTCCATGCTCGATGGTACTTAGACTCA	--AGCTGGAT	---TGACTGATGTAGGTGC
G5	GCTAATTGCTCTGGAACTGAAACAAACACAGCCGGATAAGTTGA	-TGATCTAGGAAC	
G1	TGCTGATCTGGTACTTGTGTTAATTGC	-AGACCTAATTTTACTATAATGGTGGTGC	TCCT-----GCAAATTGTTAATTGTTAGAAA-AACTTTATTATAATGCTGCTG
G5			
G1	CTTAAGGAGAAGCTAATGTAATTAAACCTTCGCAGCAAATAATGCTGCTAGAGGTATAT	CTT-----TCGTTCC	TGGTGCTAG--TACGT
G5			
G1	GTTGACCATG-CCA-AATAAACAGA-GTAGGCTCTGTTACCAA-TGCAGGTG	--ACTTAG	
G5	GTACACCTTGTCCATAAAAAAAAGATGCTGGTGC-TAACCAAATCCACCTGCTACT	--G	
G1	CTACTTTAGGCCACATAATGCACTTAATGTCCTACTGGCACTGCACTTGATGATGGAG		
G5	CTAATTAGTCACATAATGTAACGTTAAATGCCCTGCTGGTACCGCAATGCAAGGTGGAG		
G1	TGACAGATGTTTTG--ATAGATCAGCCGCATAATGTTAAATGCAAACCTAACCTTA		
G5	CAACAGATTATGCAAGAATA-ATCA	--CAGATGTTAATTGAGAATTAAATTTTA	
G1	CTATAATGGTGGTCTCTTAAGGTGAAGGCTCTGGCTTTAAGTTTTGCTGCTGGTGC		
G5	--TAATGA-----AA-----ATGCTCC-----AAATTTAA-----		
G1	TGCCGCTGCAGGTGTTGCTGCCGTTACTAGTTAATGTTACCTGCCAACTAAACAAA		
G5	-----TGCAGGTG-----CTAGTACATGCACAGCTTGTCCGGTAAACAGAGT		
G1	CGATTCTCTGCCACTGCAGGT	--GCCTAAGCTAATTAGCCACATAATGTTAGCAATT	
G5	TGGTGGTGCATTGACTGCTGGTAATGCC	--GCTACCATAGTCGCATAATGTAACGTCGC	

REPLACEMENT SHEET

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Fig. 3b₂

REPLACEMENT SHEET

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55 KD i-antigen protein

SEQ ID NO: 7 MKNNILVILI ISLFINQIKS ANC P VGTETN TAG QV DDL GT PANC VNC QKN FYY NNAA AFV
PGAST CTP CP QKKDAGAQPN PPATANLVTQ CNVKCPAGTA IAGGATDYAA II TECVN CRI
NFYNENAPNF NAGASTCTAC PVNRVGGALT AGNAATIVAQ CNVACPTGTA LDDGVTT DYV
RSFTECVKCR LNF YYNGNNG NTPFNP GKSQ CTPCPAIKPA NVAQATLGND ATITAQC NV
CPDGTISAAG VNNWVAQNT E CTNCA PNF YN NNAPNFNP GNG STCLPCPANK DYGA EA TAGG
AATLA KQC NI ACPDGTAIAS GATNYVILQT ECLNCA ANFY FDGNNFQAGS SRCKACPANK
VQGAVATAGG TATLIAQCAL ECPAGTVLTD GTTSTYKQAA SECVKCAANF YTTKQTDWVA
GIDTCTSCNK KLTSGAEANL PESAKKNIQC DFANFLSISL LLISYYLL**
10 20 30 40 50 60
70 80 90 100 110 120
130 140 150 160 170 180
190 200 210 220 230 240
250 260 270 280 290 300
310 320 330 340 350 360
370 380 390 400 410 420
430 440 450 460 470 480

Fig. 4

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48 KDa G1 i-antigen repeats

SEQ ID NO:	10	20	30	40	50	60	70	80	90
8	CPPTGTTTNTAGQVDDLGTPANCVNCQKNFYXNNAA---	AFMVGASTCTCPCHOKTDAGAQPNPPATENLVT-QCNVK							
9	CPTGTALNDG VTPVDFRSAA QCVKCKPNFY YNGGSPPGEA FGVWFAANGA RAVGAAVATIS OCVPCCOLARN	NFMAGASTCTTACHVNRVGGATAGNAATIV--AQCNVA							
10	CPTGTIVLDG VTPVVENTSAT LCVKCKPNFY YNGGSPPGEA FGVWFAANGA RAVGAAVATIS OCVPCCOLARN	NFNGNNTPFPNGRSDCTPCPAIKPANVAQATILGNDATITAQCNVA							
11	CPTGTIAQPC VTPVFSNSST QCSQVLANYF RAVGAAVATIS OCVPCCOLARN	NFNGNTPCPANDTCPCPAIKPANVAQATILGNDATITAQCNVA							
12	CPFASTVDDG TSTPVVSAT EPIKCSACFF ASKTRG-FPK	NEQAGSSRQKACPANKVQGAVATAQQATLI-AQCALE							
*	*	*	*	*	*	*	*	*	*

Fig. 5a

55 kDa G5 i-antigen repeats

SEQ ID NO: 55	1	2	3	4	5	6
	CPVGTETNTAGQVDDLGTPANCVNCQKNFYXNNAA---	CPAGTAIDGG-ATDVAIIITTECVNCRINFYNNAP---	CPGTGTAAIDDGVIIDYVRSFTIECVCRINFYNNAP---	CPGTGTAAIDDGVIIDYVRSFTIECVCRINFYNNAP-	CPDGTTSAAGVNNVAQN-TECTINCAPNFYNNAP---	CPDGTTSAAGVNNVAQN-TECTINCAPNFYNNAP-
56	CPAGTAIDGG-ATDVAIIITTECVNCRINFYNNAP---	CPAGTAIDGG-ATDVAIIITTECVNCRINFYNNAP---	CPGTGTAAIDDGVIIDYVRSFTIECVCRINFYNNAP-	CPGTGTAAIDDGVIIDYVRSFTIECVCRINFYNNAP-	NEQAGSSRQKACPANKVQGAVATAQQATLI-AQCALE	NEQAGSSRQKACPANKVQGAVATAQQATLI-AQCALE
57						
58						
59						
60						

Fig. 5b

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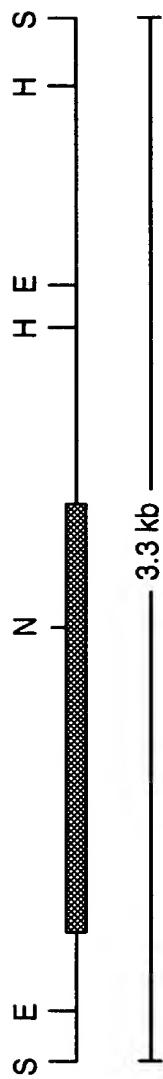


Fig. 6

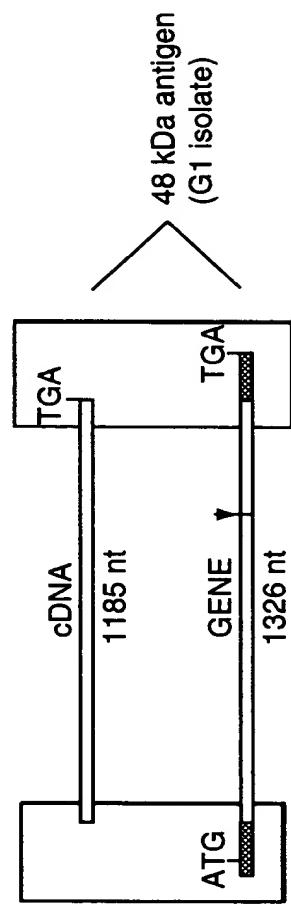


Fig. 7a



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897 L CTC T T C F 1172
cdna gene
1172 1227

Fig. 7b

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Fig. 8

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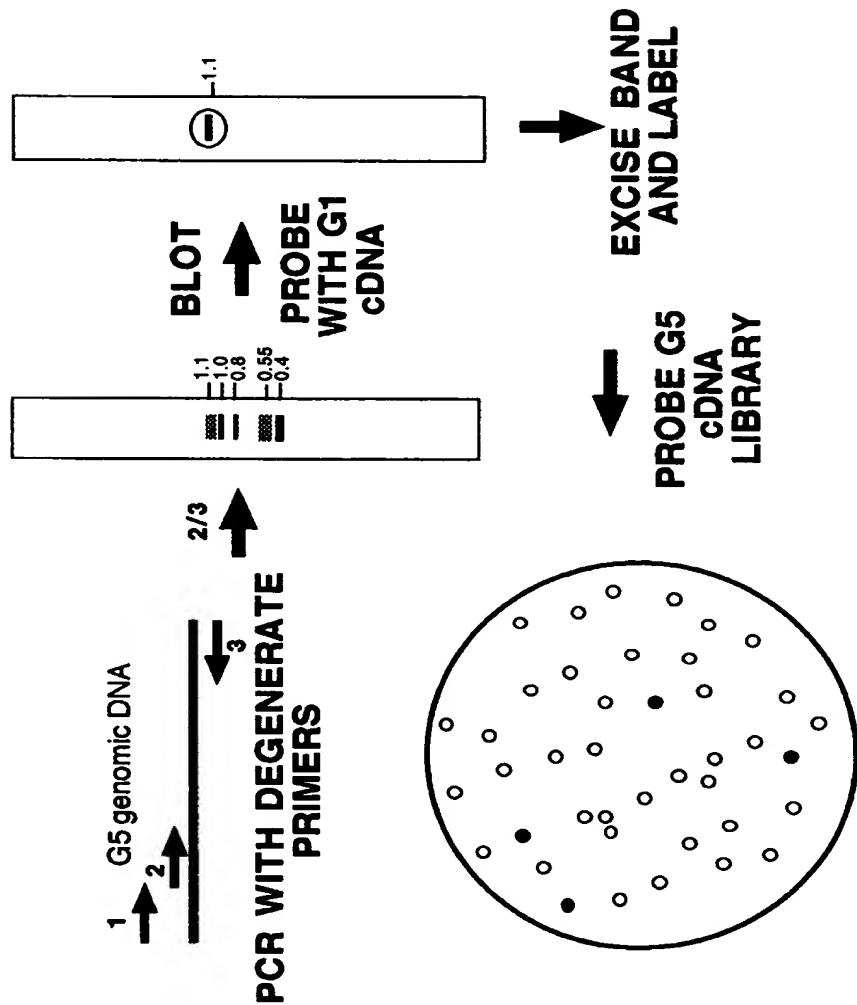


Fig. 9

REPLACEMENT SHEET



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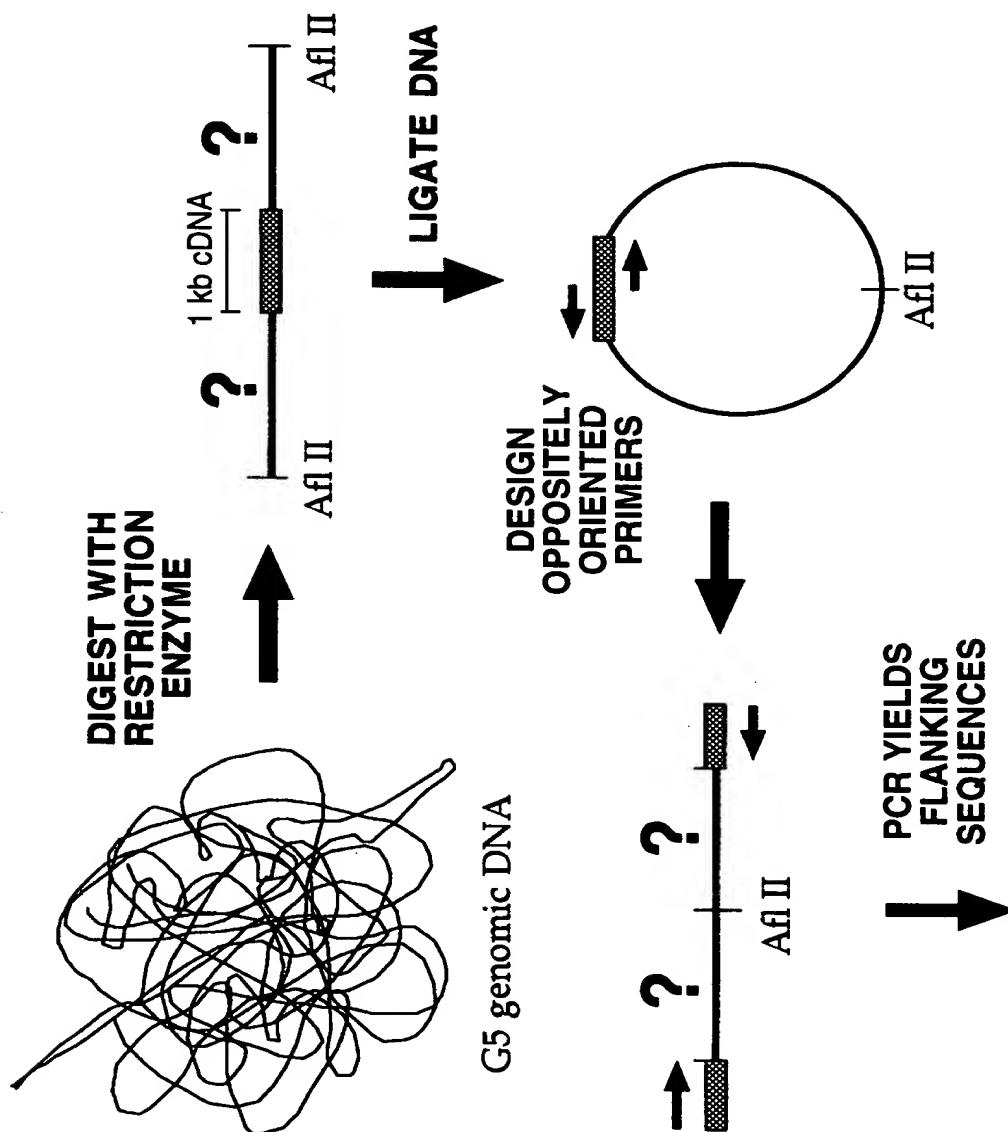


Fig. 10

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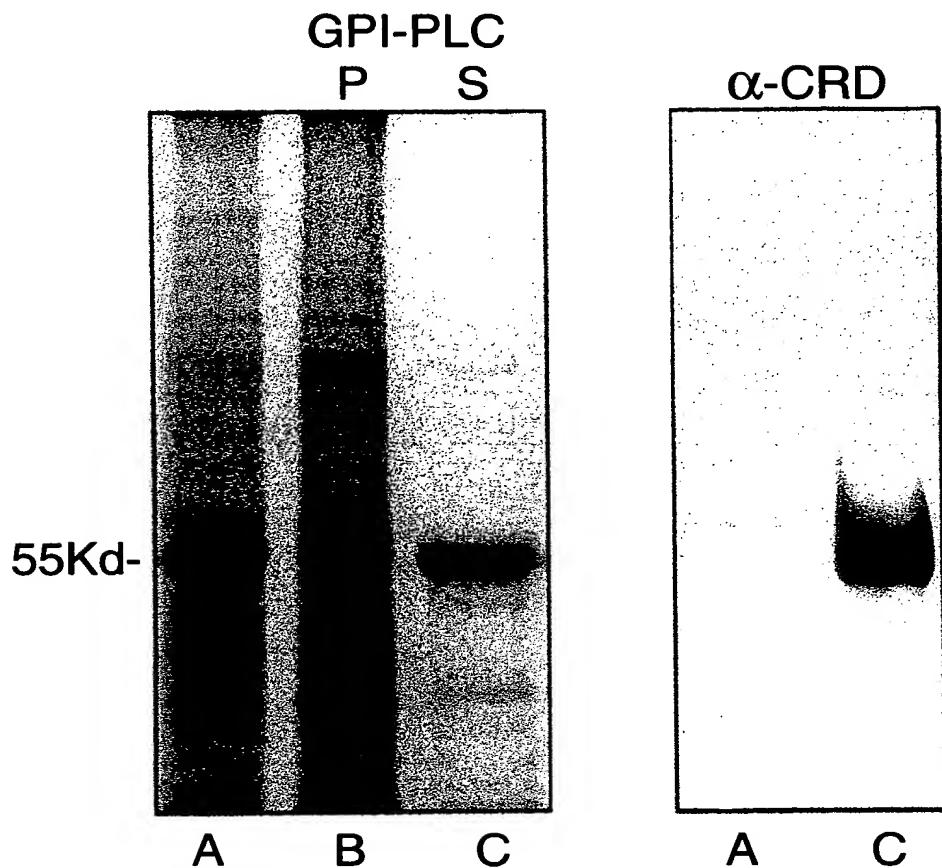


Fig. 11

REPLACEMENT SHEET

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SEQ ID NO: Primers for synthesis of G5 synthetic gene.

- 3201:
70 ATG GGA ATT CAA ATG AAG AAC AAC ATC CTG GTG ATC CTG ATC ATC TCT CTG TTC ATC AAC CAG ATC AAG
TCT GCT AAC TGT CCT GTG GGA ACC GAG ACC AAC ACC GCT GGA CAG GTG
- 3202:
71 CTC CAG GCA CGA AAG CAG CAG CGT TGT TGT AGT AGA AGT TCT TCT GAC AGT TCA CAC AGT TAG CAG GGG
TTC CCA GGT OGT CCA CCT GTC CAG CGG TGT TGG TC
- 3203:
72 CGC TGC TGC TTT CGT GCC TGG ACC TTC TAC CTG TAC CCC TTG TCC TCA GAA GAA GGA CGC TGG AGC TCA
GCC TAA CCC TCC TGC TAC CGC TAA CCT GGT G
- 3204:
73 GAT GAT AGC AGC GTA GTC GGT AGC TCC TCC AGC GAT AGC GGT TCC AGC AGG ACA CTT CAC GTT ACA CTG
GGT CAC CAG GTT AGC GGT AGC AGG AG
- 3205:
74 GCT ACC GAC TAC GCT GCT ATC ATC ACC GAG TGT GTG AAC TGT CGC ATC AAC TTC TAC AAC GAG AAC GCT
CCT AAC TTC AAC GCT GGA GCT TCT ACC TGT ACC GCT TGT CCT GTG AAC CGC GTG GGA GGA GCT CTG ACC
- 3206:
75 GGT GAA AGA GCG CAC GTA GTC GGT GGT CAC TCC GTC GTC CAG AGC GGT TCC GGT AGG ACA AGC CAC CTT
ACA CTG AGC CAC GAT GGT AGC AGC GTT TCC AGC GGT CAG AGC TCC TCC CAC GCG
- 3207:
76 GAC TAC GTG CGC TCT TTC ACC GAG TGT GTG AAG TGT CGC CTG AAC TTC TAC TAC AAC GGA AAC AAC GGA
AAC ACC CCT TTC AAC CCT GGA AAG TCT CAG
- 3208:
77 GTG ATG GTA GCG TCG TTT CCC AGG GTA GCC TGA GCC ACG TTA GCA GGC TTG ATA GCA GGA CAA GGG GTA
CAC TGA GAC TTT CCA GGG TTG AAA GG
- 3209:
78 GGG AAA CGA CGC TAC CAT CAC CGC TCA GTG TAA CGT GGC TTG TCC TGA CGG AAC CAT CTC TGC TGC TGG
AGT GAA CAA CTG GGT GGC TCA GAA C
- 3210:
79 CAG ACA GGT AGA GTT TCC AGG GTT GAA GTT AGG AGC GTT GTT GTT GTA GAA GTT AGG AGC ACA GTT GGT
ACA CTC GGT GTT CTG AGC CAC CCA GTT GTT C
- 3211:
80 CCC TGG AAA CTC TAC CTG TCT GCC TTG TCC TGC TAA CAA GGA CTA CGG AGC TGA GGC TAC CGC TGG AGG
AGC TGC TAC CCT GGC TAA GC
- 3212:
81 GGT CTG CAG GAT CAC GTA GTT GGT AGC TCC AGA AGC GAT AGC GGT TCC GTC AGG ACA AGC GAT GTT ACA
CTG CTT AGC CAG GGT AGC AGC
- 3213:
82 CAA CTA CGT GAT CCT GCA GAC CGA GTG TCT GAA CTG TGC TGC TAA CTT CTA CTT CGA CGG AAA CAA CTT
CCA GGC TGG ATC TTC TGC TAA GG
- 3214:
83 GAG CGA TCA GGG TAG CGG TTC CTC CAG CGG TAG CCA CAG CTC CCT GCA CCT TGT TAG CAG GAC AAG CCT
TAC AGC GAG AAG ATC CAG CCT GG
- 3215:
84 GAA CGG CTA CCC TGA TCG CTC AGT GTG CTC TGG AGT GTC CTC CTG GAA CGG TGC TGA CGG ACG GAA CCA
CCT CTA CCT ACA AGC AGG CTG CTT C
- 3216:
85 GGT GTC GAT TCC AGC CAC CGA GTC GGT CTG CTT GGT GGT GTA GAA GTT AGC AGC ACA CTT CAC ACA CTC
AGA AGC AGC CTG CTT GTA GGT AG
- 3217:
86 GGG TGG CTG GAA TCG ACA CCT GTA CCT CTT GTA ACA AGA AGC TGA CCT CTG GAG CTG AGG CTA ACC TGC
CTG AGT CTG CTA AGA AGA ACA TC
- 3218:
87 GAG GGA TCC TTA TTA CAG CAG GTA GTA AGA GAT CAG CAG CAG AGA GAT AGA CAG GAA GTT AGC GAA GTC
ACA CTG GAT GTT CTT CTT AGC AGA CT

Fig. 12

Title: DIAGNOSTIC AND PROTECTIVE ANTIGEN GENE SEQUENCES OF ICHTHYOPHTHIRIUS

Applicant(s): CLARK et al.

Serial No.: 09/497,967

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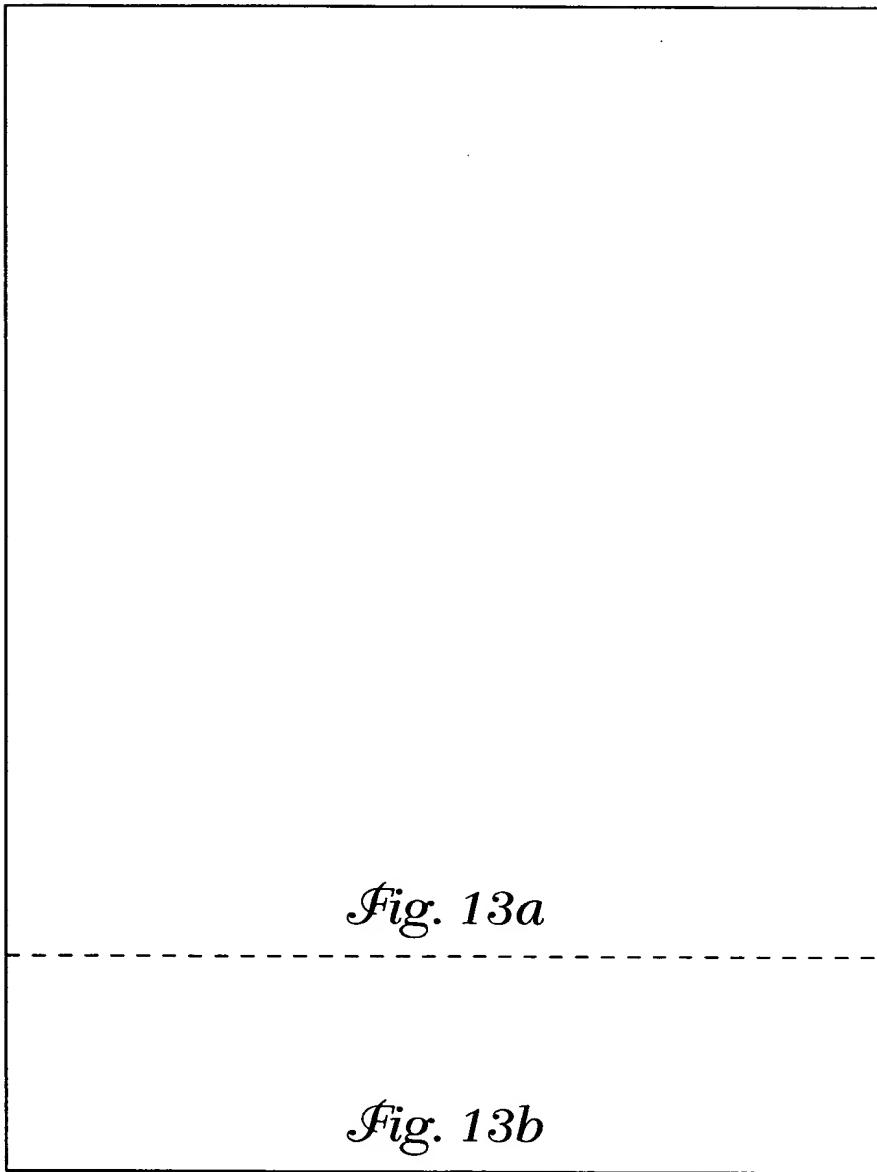


Fig. 13

REPLACEMENT SHEET



G5 proline mutant 18/27

SEQ ID NO: 53 ATGAAGAACAA CATCCGGT GATCCTGATC ATCTCTCTGT TCATCAACCA GATCAAGTCT
GCTAACTGTC CTGTGGAAC CGAGACCAAC ACCGCTGGAC AGGTGGACGA CCTGGGAACC
CCTGCTAACT GTGTGAAC TG TCAGAAGAAC TTCTACTACA ACAACGCTGC TGCTTTCTGT
CCTGGAGCTT CTACCTGTAC CCCTTGTCCT CAGAAGAAGG ACGCTGGAGC TCAGCCTAAC
CCTCCTGCTA CCGCTAACCT GGTGACCCAG TGTAAACGTGA AGTGTCCCTGC TGGAACCGCT
ATCGCTGGAG GAGCTACCGA CTACCGTGT ATCATCACCG AGTGTGTGAA CTGTCGCATC
AACTTCTACA ACGAGAACGC TCCTAACTTC AACGCTGGAG CTTCTACCTG TACCGCTTGT
CCTGTGAACC GTGTGGGAGG AGCTCTGACC GCTGGAAACG CTGCTACCAT CGTGGCTCAG
TGTAAACGTGG CTTGTCCTAC CGGAACCGCT CTGGACGACG GAGTGACCCAC CGACTACGTG
CGCTCTTCA CCGAGTGTGT GAAGTGTGCGC CTGAACCTCT ACTACAACGG AAACAACGGA
AACACCCCTT TCAACCCCTGG AAAGTCTCAG TGTACCCCTT GTCCTGCTAT CAAGCCTGCT
AACGTGGCTC AGGCTACCCCT GGGAAACCGAC GCTACCATCA CCGCTCAGTG TAACGTGGCT
TGTCTGTGAGC GAACCATCTC TGCTGCTGGA GTGAACAACT GGGTGGCTCA GAACACCGAG
TGTACCAACT GTGCTCCTAA CTTCTACAAAC AACAAACGTC CTAACCTCAA CCCTGGAAAC
TCTACCTGTC TGCCCTGTC TGCTAACAAAG GACTACGGAG CTGAGGCTAC CGCTGGAGGA
GCTGCTACCC TGGCTAACGCA GTGTAAACATC GCTTGTCTG ACGGAACCGC TATCGCTTCT
GGAGCTACCA ACTACGTGAT CCTGCAGACC GAGTGTCTGA ACTGTGCTGC TAACTTCTAC
TTCGACGGAA ACAACCTCCA GGCTGGATCT TCTCGCTGTA AGGCTTGTCC TGCTAACAAAG
GTGCAGGGAG CTGTGGCTAC CGCTGGAGGA ACCGCTACCC TGATCGCTCA GTGTGCTCTG
GAGTGTCTG CTGGAACCGT GCTGACCGAC GGAACCACCT CTACCTACAA GCAGGCTGCT
TCTGAGTGTG TGAAGTGTGC TGCTAACCTC TACACCACCA AGCAGACCGA CTGGGTGGCT

Fig. 13a

REPLACEMENT SHEET

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proline mutant

1270	1280	1290	1300	1310	1320
GGAATCGACA	CCTGTACCTC	TTGTAACAAG	AAGCTGACCT	CTGGAGCTGA	GGCTAACCTG
1330	1340	1350	1360	1370	1380
CCTGAGTCTG	CTAAGAAGAA	CATCCAGTGT	GACTTCGCTA	ACTTCCTGTC	TATCTCTCTG
1390	1400	1410	1420	1430	1440
CTGCTGATCT	CTTACTACCT	GCTG.....

Fig. 13b



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G5 proline mutant protein

↓ 10 20 30 40 50 60
SEQ ID NO: 54 MKNNIPVILI ISLFINQIKS ANCPVGTEIN TAGQVDDLGT PANCVNCQKN FYYNNAAAFV
70 80 90 100 110 120
PGASTCTPCP QKKDAGAQPN PPATANLVTO CNVKCPAGTA IAGGATDYAA IITECVNCRI
130 140 150 160 170 180
NFYNENAPNF NAGASTCTAC PVNRVGGALT AGNAATIVAQ CNVACPTGTA LDDGVTTDYV
190 200 210 220 230 240
RSFTECVKCR LNFYYNGNNG NTPFNPNGKSQ CTPCPAIKPA NVAQATLGND ATITAQCNV
250 260 270 280 290 300
CPDGTISAAG VNNWVAQNT ECTNCAPNFYN NNAPNFNPGN STCLPCPANK DYGAETAGG
310 320 330 340 350 360
AATLAKQCNI ACPDGTAIAS GATNYVILQT ECLNCAANFY FDGNINFOAGS SRCKACPANK
370 380 390 400 410 420
VQGAVATAGG TATLIAQCAL ECPAGTVLTD GTTSTYKQAA SECVKCAANF YTTKQTDWVA
430 440 450 460 470 480
GIDTCTSCNK KLTSGAEANL PESAKKNIQC DFANFLSISL LLISYYLL...

Fig. 14

Title: DIAGNOSTIC AND PROTECTIVE ANTIGEN GENE SEQUENCES OF ICHTHYOPHTHIRIUS
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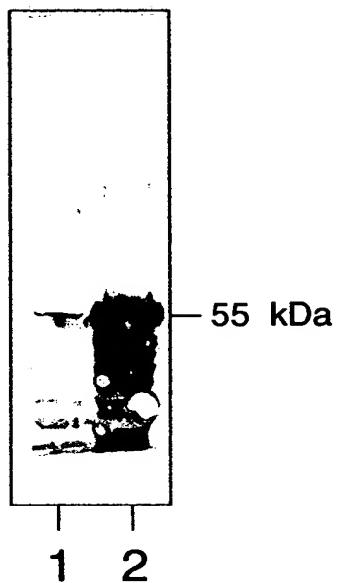


Fig. 15

REPLACEMENT SHEET

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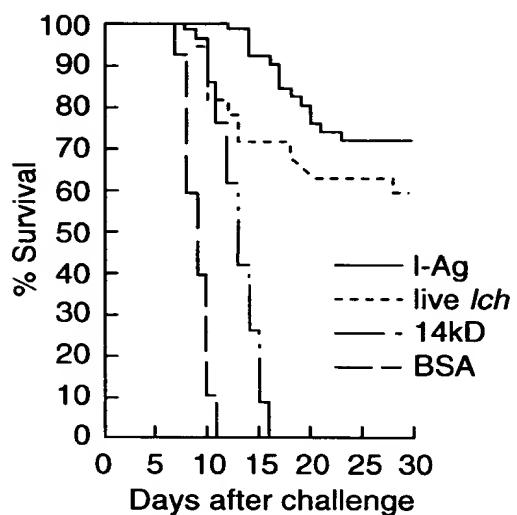


Fig. 16

REPLACEMENT SHEET

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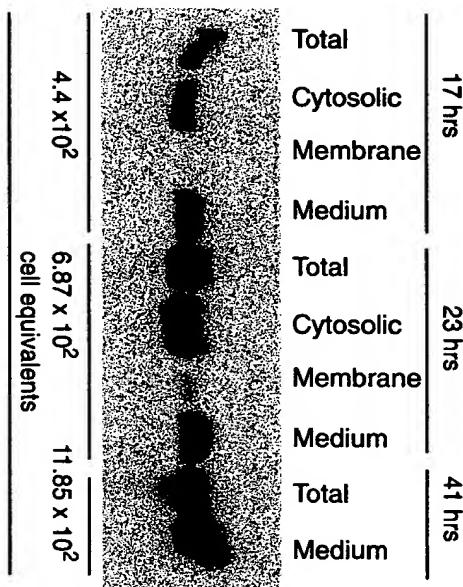


Fig. 17

Title: DIAGNOSTIC AND PROTECTIVE ANTIGEN GENE SEQUENCES OF ICHTHYOPHTHIRIUS
Applicant(s): CLARK et al.
Serial No.: 09/497,967

Filed: February 4, 2000

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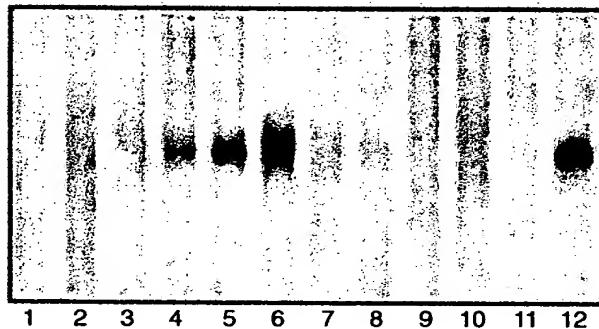


Fig. 18

REPLACEMENT SHEET

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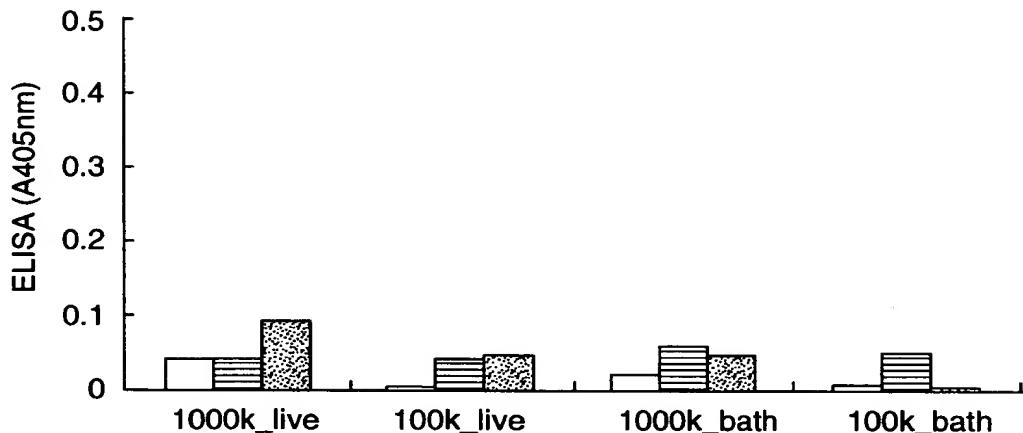


Fig. 19a

- Week 2
- ▨ Week 4
- ▨ Week 6

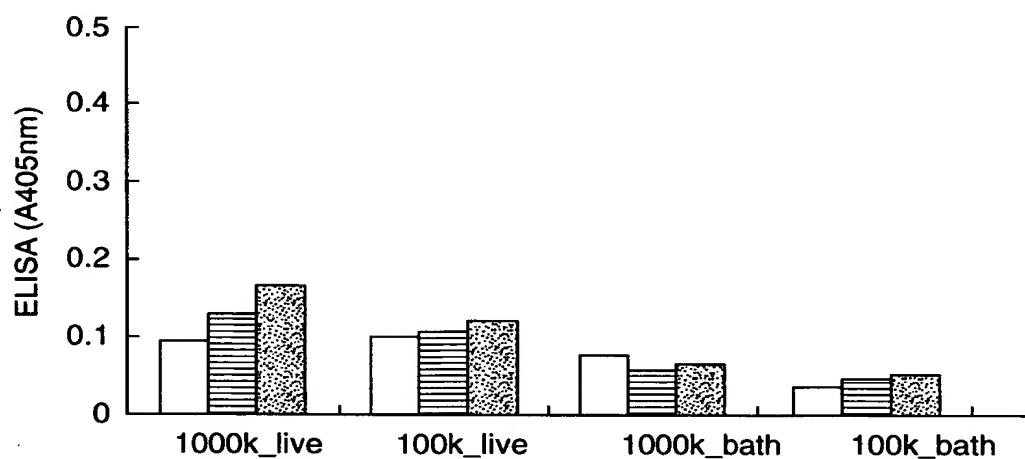
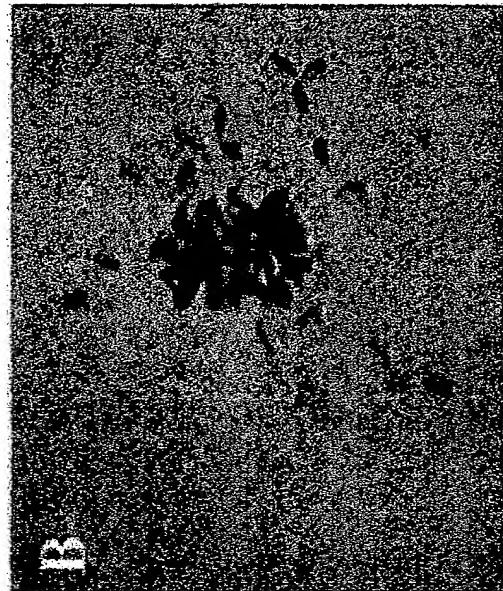


Fig. 19b

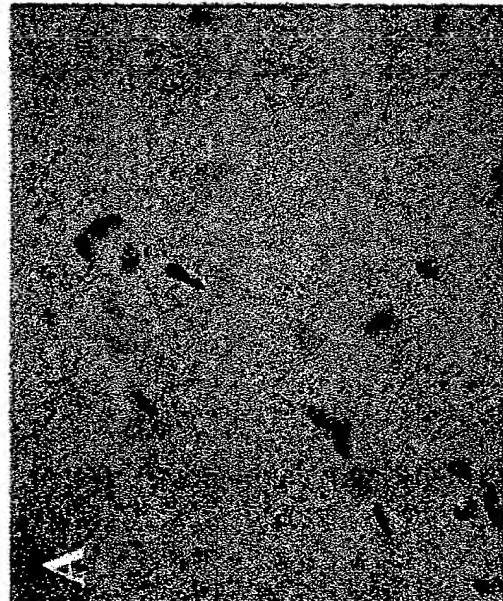
- Week 2
- ▨ Week 4
- ▨ Week 6



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Serum: anti-live TG1 (1 : 20)



Serum: anti-live Neo (1 : 20)
(negative control)

Fig. 20a

Fig. 20b

Title: DIAGNOSTIC AND PROTECTIVE ANTIGEN GENE SEQUENCES OF ICHTHYOPHTHIRIUS
Applicant(s): CLARK et al.
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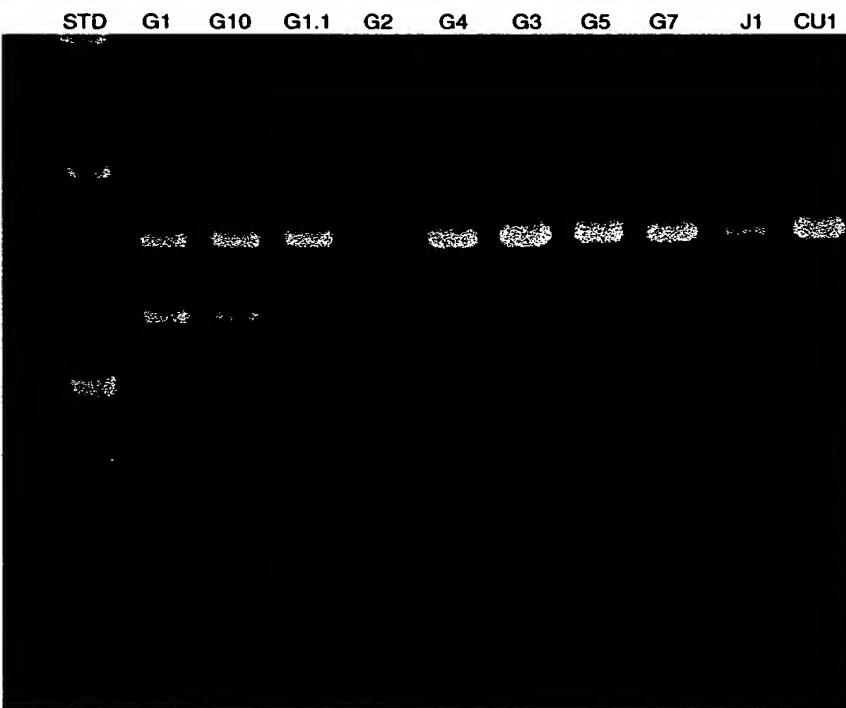


Fig. 21